G-002

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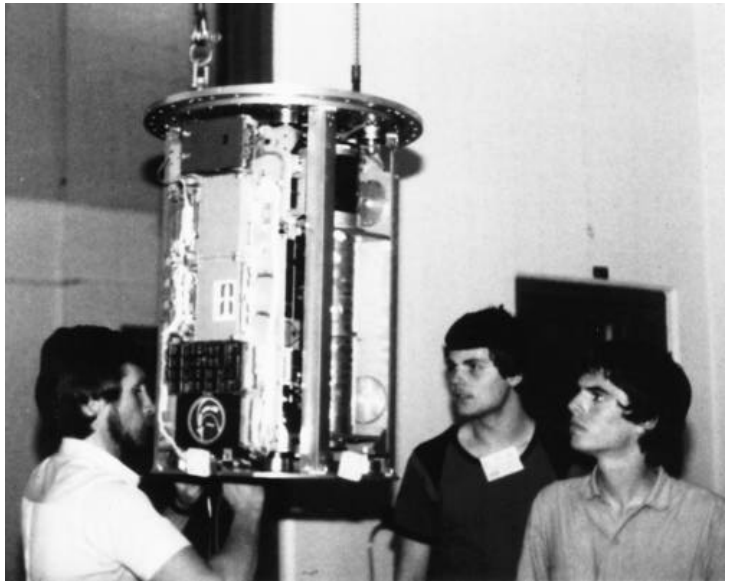
Customer: Kayser-Threde GMBH;
Reiner Klett
Payload Mgr: Gunter Schmitt
NASA Tech Mgr: Albert D. Blunt
Mission: STS-7, June 18, 1983

Winners of a nationwide competition among West German High School students provided the experiments for G-002. Their five experiments covered a full spectrum of science and technology with studies of crystal growth, nickel catalysts, plant contamination by heavy metals, microprocessor controlled sequencers, and a biostack studying the influence of cosmic radiation on plant seeds. The competition was organized by the nonprofit Jugend Forscht Association and funded by the German Ministry for Research and Technology. The aerospace company Kayser-Threde donated the GAS flight opportunity and helped the students build and integrate their experiments.



Gunter Schmitt (L) and his colleagues prepared their experiment assembly for placement into the GAS canister.

G-305

Customer: Dept. of Defense Space Test Program; Col. Richard B. Kehl
Payload Mgr: Robert Conway
NASA Tech Mgr: Henry W. Albright
Mission: STS-7, June 18, 1983

The Space Ultraviolet Radiation Environment (SURE) instrument, developed by the U.S. Naval Research Laboratory (NRL) Space Science Division, marked the debut of the GAS Motorized Door Assembly (MDA). The MDA made it possible for the payload's spectrometer to measure the natural radiation in the upper atmosphere at extreme ultraviolet wavelengths. SURE was first in a series of experiments planned by the NRL which ultimately would have the capability of providing global pictures of "ionospheric weather". This capability was expected to provide immediate information about the effects of ionospheric storms and solar flares or eruptions on communications systems around the globe.

Henry Fitch, New Mexico State Physical Sciences Lab, worked on the GAS program's first Motorized Door Assembly.

G-033

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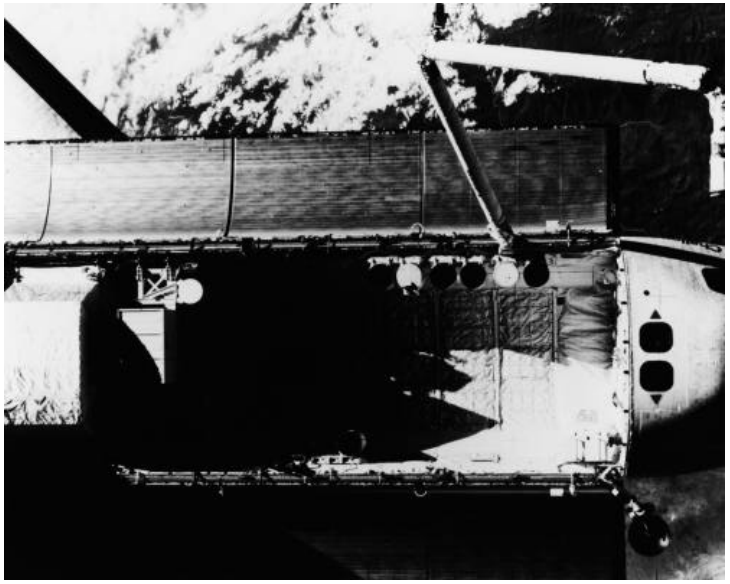
Customer: Steven Speilberg
Payload Mgr: Kirk R. Haselton
NASA Tech Mgr: Lawrence R. Thomas
Mission: STS-7, June 18, 1983

Movie director Steven Speilberg donated G-033 to the California Institute of Technology after receiving the payload as a gift. Working late nights and holidays, fifteen undergraduates in Cal Tech's Student Space Organization designed and built two experiments, as well as the computer that ran and monitored their payload. One experiment examined oil and water separation in microgravity. The second experiment grew radish seeds, testing the theory that roots grow downward because gravity forces dense structures (amyloplasts) to settle to the bottom of root cells.



The seven GAS payloads on STS-7 were photographed from the German Shuttle Pallet Satellite (STS-7's major payload). The German payload was flying free in space after the Remote Manipulator System (foreground) lifted it out of the shuttle bay.

G-009

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Customer: Purdue University; C. B. Wise
Payload Mgr: Dr. John T. Snow
NASA Tech Mgr: Richard Palace
Mission: STS-7, June 18, 1983

Purdue University students conducted three experiments in their payload. The first tested seed growth in microgravity in an unconventional way—by germinating seeds on a spinning disc. The degree of gravity on a spinning wheel is highest at its rim and lowest at its center. Using this fact, the students planned to chart the influence of different levels of gravity on seed germination by placing seeds at different radial locations on the disk. Their payload also included a nuclear particle detection experiment. This experiment traced and recorded the paths of nuclear particles encountered in the near-Earth space environment. A third experiment on fluid dynamics measured the bulk oscillations of a drop of mercury immersed in a clear liquid. Purdue's Schools of Science, Engineering, and Agriculture developed the flight hardware for the project, with the U.S. Navy providing access to the necessary test facilities.

Purdue student Gene McGinnis concentrated on G-009's preparation.

G-088

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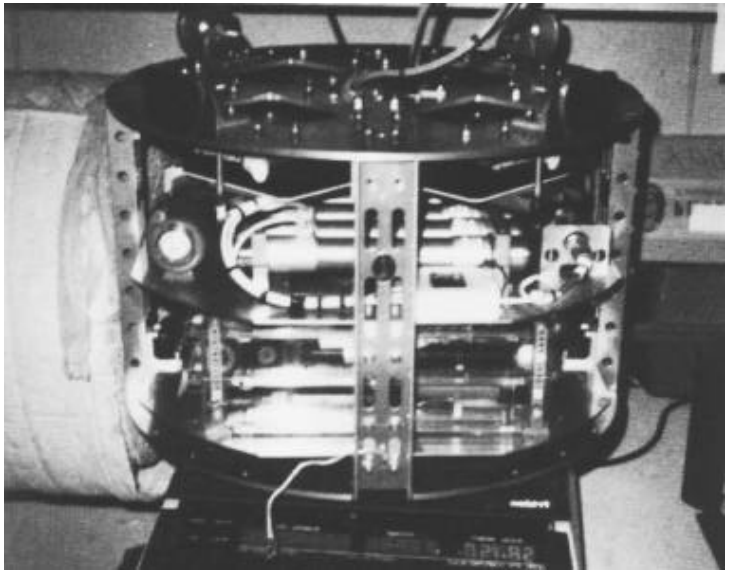
Customer: Edsyn, Inc; William S. Fortune
Payload Mgr: Wayne A. Murray
NASA Tech Mgr: Bernard R. Karmilowicz
Mission: STS-7, June 18, 1983

Virtually nothing was known about soldering in space when Edsyn, Inc. conceived this payload. Looking ahead to the necessity of doing maintenance and repairs in space, Edsyn ran over 60 experiments on the soldering and de-soldering equipment in G-088. Passive experiments determined how soldering gear, such as static/temperature meters, electronic shears, check valves, and soldering irons, would function in space. Powered experiments investigated the physics of soldering in microgravity and a vacuum. They tested the reaction of flux; measured the solder's wetting and surface tension; tested metallurgical properties; and determined how to remove solder from a printed circuit board.



Over 60 soldering experiments flew in G-088.

G-345

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Customer: Goddard Space Flight Center;
Noel W. Hinners
Payload Mgr: Robert Kreplin
NASA Tech Mgr: Paul Velgos
Mission: STS-7, June 18, 1983

Film used in instruments such as Spacelab 2's High Resolution Telescope and Spectrograph faced a severe challenge. It had to be strong enough to withstand the effects of contaminants given off by the shuttle propulsion system and the payloads, while sensitive enough to detect ultraviolet radiation. Prior to Spacelab 2's flight, the Naval Research Laboratory and Goddard Space Flight Center designed the Ultraviolet Photographic Test Package to expose film samples to the space environment. The experimenters evaluated the effects of shuttle bay contaminants on these sensitive emulsions and identified possible design implications for new instruments.

Robert Kreplin (L), U.S. Naval Research Lab, showed G-345 to Clarke Prouty, GAS technical liaison.

G-012

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Customer: RCA; David Shore
Payload Mgr: Joseph Carbone
NASA Tech Mgr: Gary W. Cooper
Mission: STS-7, June 18, 1983

Science, art, shop, and music students took part in the five-year GAS project at Camden and Woodrow Wilson High Schools in Camden, New Jersey. Backed by their faculties and technical experts at RCA Corporation and Temple University, science students built an ant farm to learn if weightlessness would affect the colony's social structure. Behind the scenes, helpers from other classes fabricated the container housing, painted Orbit '81 murals, produced a GAS newsletter, and enacted plays for fund raisers. Although the colony perished aboard the Shuttle, learning did not stop after the flight. Biology students investigated the colony upon its return. They concluded that the ants died of dehydration when the GAS container was purged with dry air during preflight preparations. Even so, students rated their project success: in their words, it "gave Camden students the opportunity to prove that they are as capable in the sciences as they are in sports."

Students and teachers of Camden and Woodrow Wilson High Schools worked with their RCA sponsors on the ant colony experiment.